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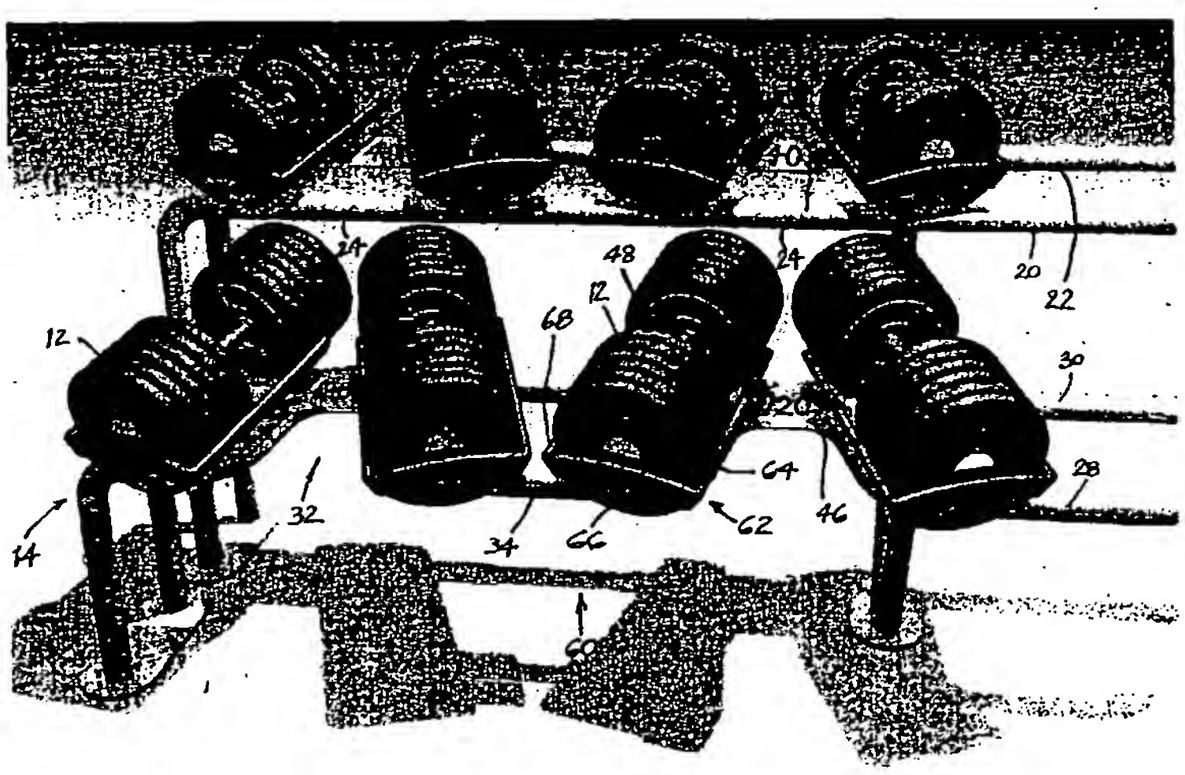
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: GYMNASIUM EQUIPMENT



(57) Abstract: A rack stand for supporting dumbbells (12) has at least one tier (14) having a front part and a rear part, at least the front part being interrupted by one or more gaps (32) into which a person can locate at least a part of their body, such as a leg, the gap having a depth towards the rear part sufficient to allow the person to lift a dumbbell supported on the tier alongside the gap without leaning over the rack stand. A dumbbell, comprising a handle and a plurality of weight discs mounted thereon, the weight discs being so arranged along the handle as to leave a gap between an innermost two of the weight discs at a central portion of the handle used for gripping by a user, and means (48) located on at least one of the innermost two weight discs on an exposed side thereof adjacent the central portion which identifies the total weight of the dumbbell.

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GYMNASIUM EQUIPMENT

Field of the Invention

The present invention relates to gymnasium equipment and, in particular, to a rack stand for supporting dumbbells of the kind used for weight training. For ease of understanding, the invention will be described by reference to the support of dumbbells. However, it will be appreciated by persons skilled in the art that the invention is not limited thereto, but has a wider application for supporting any weighted objects at an elevated location and which require picking up and transfer by hand to another location where weight training is performed.

Background of the Invention

There are many types of dumbbell rack stands currently available on the market and in use, which cater both for people who are committed to weight training and for people who have a more leisurely involvement therein. For all such people, it is important that a proper manual pick up technique be followed as the weight of the dumbbell to be lifted (to provide the necessary resistance for muscular development) must be heavier than objects that the person regularly lifts, and such a heavy weight may cause soft tissue or joint injury in parts of the body that are placed under stress by poor manual pick up technique. Present dumbbell rack stands, however, do not facilitate a proper manual pick up technique as they require that all users assume a biomechanically unsuitable body position when picking up dumbbells from the rack stand. People committed to weight training generally have more experience in manually picking up dumbbells from a rack stand and so many of them have, over time, adapted their bodies to a poor picking up technique that, without their knowledge, places stress on their body. Less experienced users

of dumbbells are also particularly vulnerable to injury caused by poor picking up technique. In particular, the risk of such injury is exacerbated by the configuration of conventional dumbbell rack stands which require that a user must lean forward over the stand to gain access to a dumbbell. Where a dumbbell is located at the rear of the stand (say, on a rear tier of a two tier rack stand), a greater lean forward is required as the user strains to reach the dumbbell, placing the user (and especially a less experienced user) at a heightened risk of injury during the picking up action. A user will encounter a similar problem when returning a dumbbell to the rack stand.

Another problem with present dumbbell rack stands is the absence of any means located on a dumbbell for easily or immediately identifying the total weight of the dumbbell (which includes all of its weight discs and the handle (or bar) to which the discs are mounted). The weight of dumbbells of the prior art have hitherto been ascertained by reading the weight identified on each disc and adding the disc weights, together with the weight of the handle, to arrive at a total weight of the dumbbell. This is a time consuming task that sometimes leads to errors in calculation of the total weight of a dumbbell, with unwanted consequences for the user of the dumbbell.

Many present dumbbell rack stands also suffer from the problem that a dumbbell will occasionally fall to the floor when a user attempts to quickly return it to a support plate on the stand. This may not only arise from the carelessness of a user, but in many cases arises from the poor design of the support plate, which may not provide features that correct any slight misalignment of a dumbbell when it is being returned that would otherwise cause it to fall from the support plate.

Objects and Summary of the Invention

It is an object of a first aspect of the present invention to provide a rack stand having an ergonomic configuration that enables a person to readily pick up a weighted object supported thereon without the need to significantly lean forward over the rack stand, thereby lessening the risk of injury and ensuring that the user follows a proper manual pick up technique.

It is a preferred object of this aspect of the invention to provide a rack stand that supports dumbbells at positions where their total weight is easy to identify.

It is another preferred object of this aspect of the invention to provide a rack stand having rounded corners and curved edges for improved safety over conventional, a sharply profiled, rack stands.

It is an object of a second aspect of the present invention to provide a means located on a dumbbell for easily identifying the total weight of the dumbbell when supported by a dumbbell rack stand.

It is a preferred object of this aspect of the invention to provide a weight indicator disc upon which the total weight of a dumbbell is identified, the weight indicator disc being adapted to locate against an innermost weight disc of the dumbbell on a side thereof adjacent a central portion of the dumbbell handle which can be gripped by a user.

It is an object of a third aspect of the present invention to provide a dumbbell rack stand having a plurality of support plates for dumbbells in which each support plate is so designed as to correct any slight misalignment of a dumbbell when it is being returned to it so as to prevent the dumbbell falling therefrom.

According to a first aspect of the invention, there is provided a rack stand for supporting dumbbells or like weighted objects, the rack stand comprising at least one tier having a front part and a rear part, at least the front part being interrupted by one or more gaps into which a person can locate at least a part of their body, the gap having a depth towards the rear part sufficient, when at least a part of the person's body is located in the gap, to allow the person to lift a weighted object supported on the tier alongside the gap without leaning over the rack stand.

In a preferred form, the rack stand comprises two tiers consisting of a front tier and a rear tier, the front tier having a wave-like front portion and a linear rear portion, the wave-like front portion lying in a plane that meets the linear rear portion, the plane being inclined downwardly from the rear portion to a forwardmost position of the front portion, the wave-like front portion being defined by a plurality of bends that are so formed to create gaps into which a person approaching the front portion can locate at least a part of their body.

It is preferred that the person can locate a leg into such a gap.

Preferably, the rack stand includes support plates upon which dumbbells are placed, each plate having a longitudinal axis and being secured to both the front portion and rear portion of the or each tier such that, for each gap, there is a first support plate located at one side of the gap and a second support plate located at an opposite side of the gap, the first and second support plates being so arranged that their longitudinal axes diverge in a direction from the rear portion to the front portion.

According to a second aspect of the invention, there is provided a dumbbell, comprising a handle and a plurality of weight discs mounted thereon, the weight discs being so arranged along the handle as to leave a gap

between an innermost two of the weight discs at a central portion of the handle used for gripping by a user, and means located on at least one of the innermost two weight discs on an exposed side thereof adjacent the central portion which identifies the total weight of the dumbbell.

Preferably, the weight identifying means comprises a weight indicator disc having a central aperture through which the handle is adapted to locate for mounting the disc thereto, whereby the weight indicator disc can abut against an exposed side of an innermost weight disc.

It is preferred that the weight indicator disc has a split region defined between two facing end portions of the disc that can be manipulated by a user to expand a gap separating the facing end portions so as to enable the handle to pass therethrough and be located in the central aperture , whereby ceasing the manipulation allows the expanded gap to contract and so enable the weight indicator disc to be mounted on the handle. In this way, the weight indicator disc can be "post fitted" to existing dumbbells.

According to a third aspect of the invention, there is provided a dumbbell support plate for a dumbbell rack stand, the support plate comprising a generally U-shaped member having a retention wall across an end thereof adapted to be lowermost when the support plate is supported in an inclined position on the rack stand.

Brief Description of the Drawing Figures

Fig 1 is a perspective view of a preferred rack stand according to one aspect of the invention, the rack stand being two tiered, having a front tier and a rear tier.

Fig 2 is a perspective view of another preferred rack stand according to one aspect of the invention, the rack stand having a single tier.

Fig 3 is an end view from the right side of the rack stand shown in Fig 1.

Fig 4 is a partial, left front view of yet another preferred rack stand according to one aspect of the invention, the rack stand supporting dumbbell support plates of a particularly preferred structure and including weight identification means attached to preferred locations thereof and to dumbbells supported by the support plates.

Fig 5 is a partial, left front view of the rear tier of the rack stand shown in Fig 4.

Fig 6 is a perspective view of a dumbbell adapted to be supported by the rack stands of Figs 1 to 5 and including a weight indicator disc.

Fig 7 is a front view of the weight indicator disc shown in Fig 6.

Best Mode and Other Embodiments of the Invention

The rack stand 10 shown in Figs 1 and 3 supports a plurality of dumbbells 12 on a front tier or rack portion 14 and on a rear tier or rack portion 16. The rack portions 14, 16 thus provide a two tiered rack stand, the front tier 14 having a dumbbell support level that is lower than a dumbbell support level of the rear tier 16. It will be readily apparent to persons skilled in the art that the rack stand of the invention may have any (practical) number of tiers. The dumbbell support level of the rear tier 16 comprises a pair of spaced apart, parallel extending, front and rear pipe portions 20, 22. The portions 20, 22 are held in elevated positions by integrally connected, upright pipe portions at both ends thereof and by T-shaped pipe members 23 at positions intermediate those ends. Front pipe portion 20 is lower than rear pipe portion 22. There are knurled or roughened hand grip surface areas 24 located at various positions along the front pipe portion 20 to assist a user with balance if required.

The dumbbell support level of the front tier 14 comprises a pair of front and rear pipe portions 28, 30, the front pipe portion 28 being wave-like in configuration and the rear pipe portion 30 being linear in configuration. The wave-like front pipe portion 28 lies in a plane that meets the linear rear pipe portion 30, the plane being inclined downwardly from the rear pipe portion 30 to a forwardmost position of the front pipe portion 28. The wave-like front pipe portion 28 is defined by a plurality of bends that are so formed to create gaps 32 into which a person approaching the front pipe portion can locate at least a part of their body, such as a leg. It is especially suited to placement of a leg when the person's body is side-on and the upper torso is in an upright or near upright position. The forwardmost position of the front pipe portion 28 provides a series of spaced apart support elements 34 which are lower than rear pipe portion 30.

Dumbbell placement or support plates 36 are secured, such as with screws or by welding, to both the front and rear pipe portions of each of the front and rear tiers 14, 16. The support plates are secured at such locations that each consecutive pair of support plates have respective longitudinal axes that diverge in a direction from the rear pipe portion to the front pipe portion. Each support plate 36 is curved and scallop shaped and has an internal dumbbell locating stopper for preventing the dumbbell sliding down the inclined support plate. In regard to the front tier 14, a first plate is located at one side of a gap 32 and a second plate is located at an opposite side of the same gap 32. The first and second plates are so arranged that their respective longitudinal axes diverge in a direction from the rear pipe portion to the forwardmost support elements. The divergent spatial relationship between adjacent pairs of placement plates creates space in which to locate useful information.

Between each consecutive pair of dumbbell support plates, there is a weight identification plate 46 (displaying the total weight of the dumbbell) screwed or clipped (either upright, flat, or at an angle) to the rear pipe portion. As well, weight identification discs 48 are located against the inside face of each weight disc (of a dumbbell) that is nearest the central grip portion of the handle 49 of the dumbbell. The weight identification discs 48 may be made of a suitable plastic by injection moulding. The plates 46 and discs 48 may be any desired shape, such as circular, square, rectangular, hexagonal, triangular, octagonal, or crescent shaped, so long as they identify the weight and/or any other relevant information. Weight identification means, in the form of "flag-style" markers may alternatively be used. As a result of these features, the rack stand may support not only weight information, but information of a commercial nature, such as the brands or logos of a sponsor or other entity associated with the rack stand. The same approach can be taken in relation to fixed barbells, as these too do not presently have clearly marked and visible information thereon. As such, the rack stand may provide "signpost" regions or advertising spaces that are not currently being utilised to make users of the rack stand aware of useful and commercial information.

The rack stand 50 shown in Fig 2 supports a plurality of dumbbells 12 on a single tier only, having a wave-like front portion and a linear rear portion. The rack stand 50 is thus similar to the front tier 14 of the rack stand 10. Like features have been accorded like numerals in Fig 2 for ease of understanding.

The rack stand 60 shown (partially) in Figs 4 and 5 is similar to the rack stand 10, but differs in the structure of the support plates for the dumbbells 12. In this embodiment, each support plate 62 is cradle-like and comprises a generally shallow U-shaped member 64 and an integrally formed retention wall

66 across its lowermost end. There is a rubber or hard plastic protective cover 68 around its top edges.

The dumbbell 12 shown isolated in Fig 6 has four weight discs 72 mounted on a handle 49. In the conventional manner, the weight discs are arranged along the handle in a balanced configuration so as to leave a gap 74 between an innermost two of the discs 72a,72b at a central portion 76 of the handle used for gripping by a user. Located against both of the discs 72a,72b at their facing or exposed sides adjacent the central portion 76 of the handle are respective weight indicator discs 48 which identify the total weight of the dumbbell.

As shown in Fig 7, the weight indicator disc 48 has a central aperture 78 through which the handle 49 is adapted to locate for mounting the weight indicator disc 48 to an existing dumbbell (that is, for "post fitting") or during assembly of the weight discs on the handle. When so mounted, the disc 48 may abut against the exposed side of an innermost weight disc 72a,72b. The weight indicator disc 48 has a split region defined between two facing end portions 80,82 of the disc. The end portions 80,82 can be manipulated by the hand of a user to expand the gap separating the end portions 80,82 so as to enable the handle 49 to pass therethrough and be received in the central aperture 78. Upon ceasing such manipulation, the expanded gap is allowed to contract so that the end portions 80,82 capture the handle 49 within the aperture 78. As a result, the weight indicator disc 48 is mounted on the handle of an existing dumbbell. If required, strong adhesive may be used to effectively permanently secure the weight indicator disc 48 to the exposed side of the weight disc 72a,72b, or an adjustable clip-on mechanism may be utilized for temporary securement.

In another embodiment, the weight identification means may comprise a weight disc having a total weight identified thereon as part of the original casting of the weight disc. In such an embodiment, the weight disc which has had cast thereon a total weight for a dumbbell must always be located innermost of all the weight discs forming the dumbbell having the identified total weight.

In use, a person wanting to pick up a dumbbell from a one, two or three tiered rack stand locates a part of their body into a gap, and because of the depth of the gap towards the rear portion, the person is able to lift a dumbbell supported on a rack alongside a gap without leaning over the rack. The person is able to easily identify the total weight of the dumbbell from the identification means located on the dumbbells and on the rack stand, and can return the dumbbells after use to their appropriate support plate where they are safely supported.

By minimising reach and providing easy access to the dumbbells, the user's lifting position or pick up technique is improved. The weight identification means provide clear and concise information about the weight of the dumbbells, and reduce the risk of confusion and possible injury through the lifting of heavier than expected dumbbells. The rack stand has rounded edges, due to use of pipe portions for example, and thus eliminates the risk of injury from sharp edges.

These and many other advantages of the gymnasium equipment disclosed herein will be readily apparent to persons skilled in the art.

CLAIMS:

1. A rack stand for supporting dumbbells or like weighted objects, the rack stand comprising at least one tier having a front part and a rear part, at least the front part being interrupted by one or more gaps into which a person can locate at least a part of their body, the gap having a depth towards the rear part sufficient, when at least a part of the person's body is located in the gap, to allow the person to lift a weighted object supported on the tier alongside the gap without leaning over the rack stand.

2. The rack stand of claim 1 wherein there are two tiers consisting of a front tier and a rear tier, the front tier having a wave-like front portion and a linear rear portion, the wave-like front portion lying in a plane that meets the linear rear portion, the plane being inclined downwardly from the rear portion to a forwardmost position of the front portion, the wave-like front portion being defined by a plurality of bends that are so formed to create gaps into which a person approaching the front portion can locate at least a part of their body.

3. The rack stand of claim 2 and including support plates upon which dumbbells are placed, each plate having a longitudinal axis and being secured to both the front portion and rear portion of the or each tier such that, for each gap, there is a first support plate located at one side of the gap and a second support plate located at an opposite side of the gap, the first

and second support plates being so arranged that their longitudinal axes diverge in a direction from the rear portion to the front portion.

4. A dumbbell, comprising a handle and a plurality of weight discs mounted thereon, the weight discs being so arranged along the handle as to leave a gap between an innermost two of the weight discs at a central portion of the handle used for gripping by a user, and means located on at least one of the innermost two weight discs on an exposed side thereof adjacent the central portion which identifies the total weight of the dumbbell.

5. The dumbbell of claim 4 wherein the weight identifying means comprises a weight indicator disc having a central aperture through which the handle is adapted to locate for mounting the disc thereto, whereby the weight indicator disc can abut against an exposed side of an innermost weight disc.

6. The dumbbell of claim 5 wherein the weight indicator disc has a split region defined between two facing end portions of the disc that can be manipulated by a user to expand a gap separating the facing end portions so as to enable the handle to pass therethrough and be located in the central aperture , whereby ceasing the manipulation allows the expanded gap to contract and so enable the weight indicator disc to be mounted on the handle.

7. A dumbbell support plate for a dumbbell rack stand, the support plate comprising a generally U-shaped member having a retention wall across an end thereof adapted to be lowermost

when the support plate is supported in an inclined position on the rack stand.

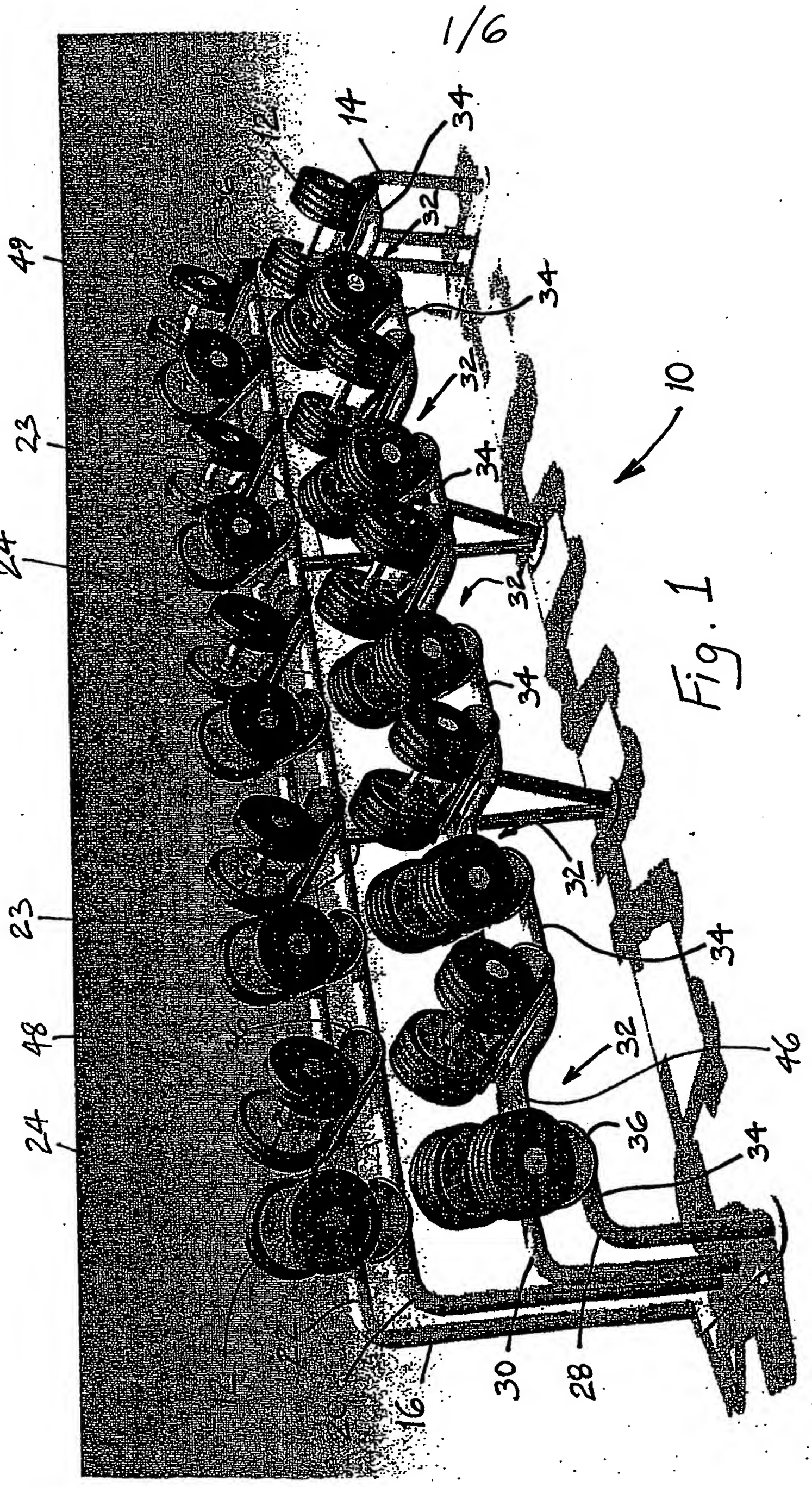


Fig. 1

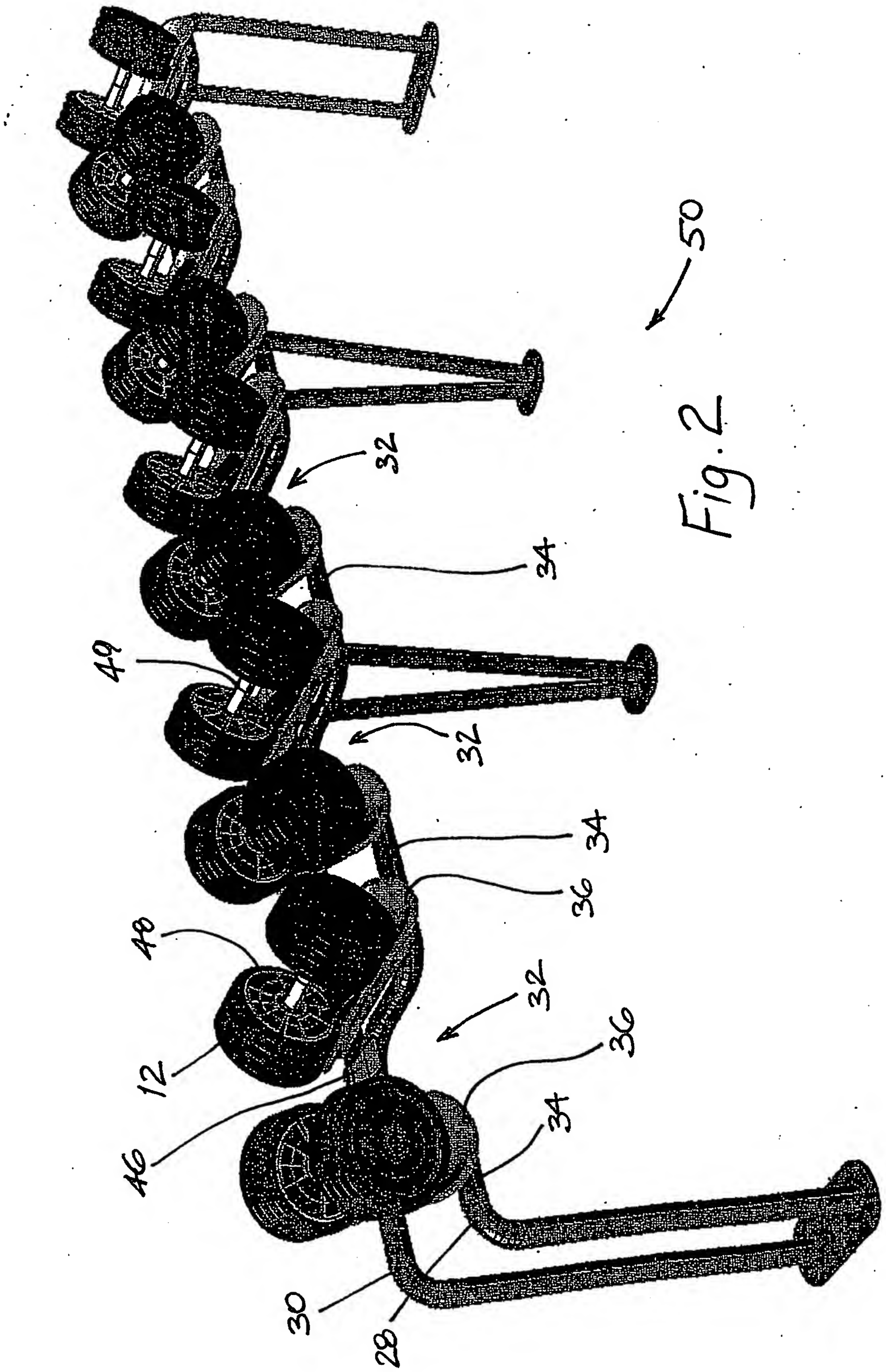


Fig. 2

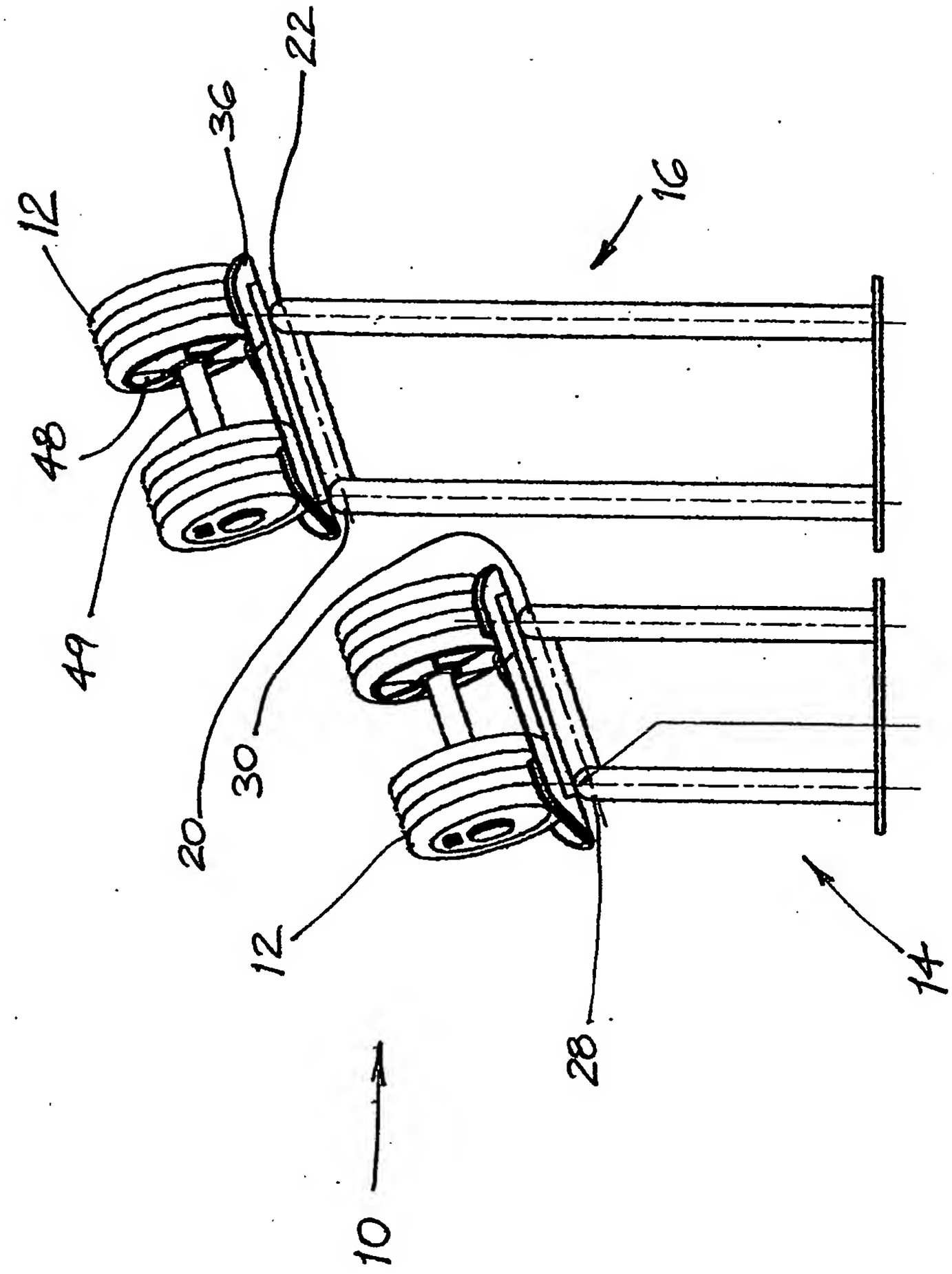


Fig. 3

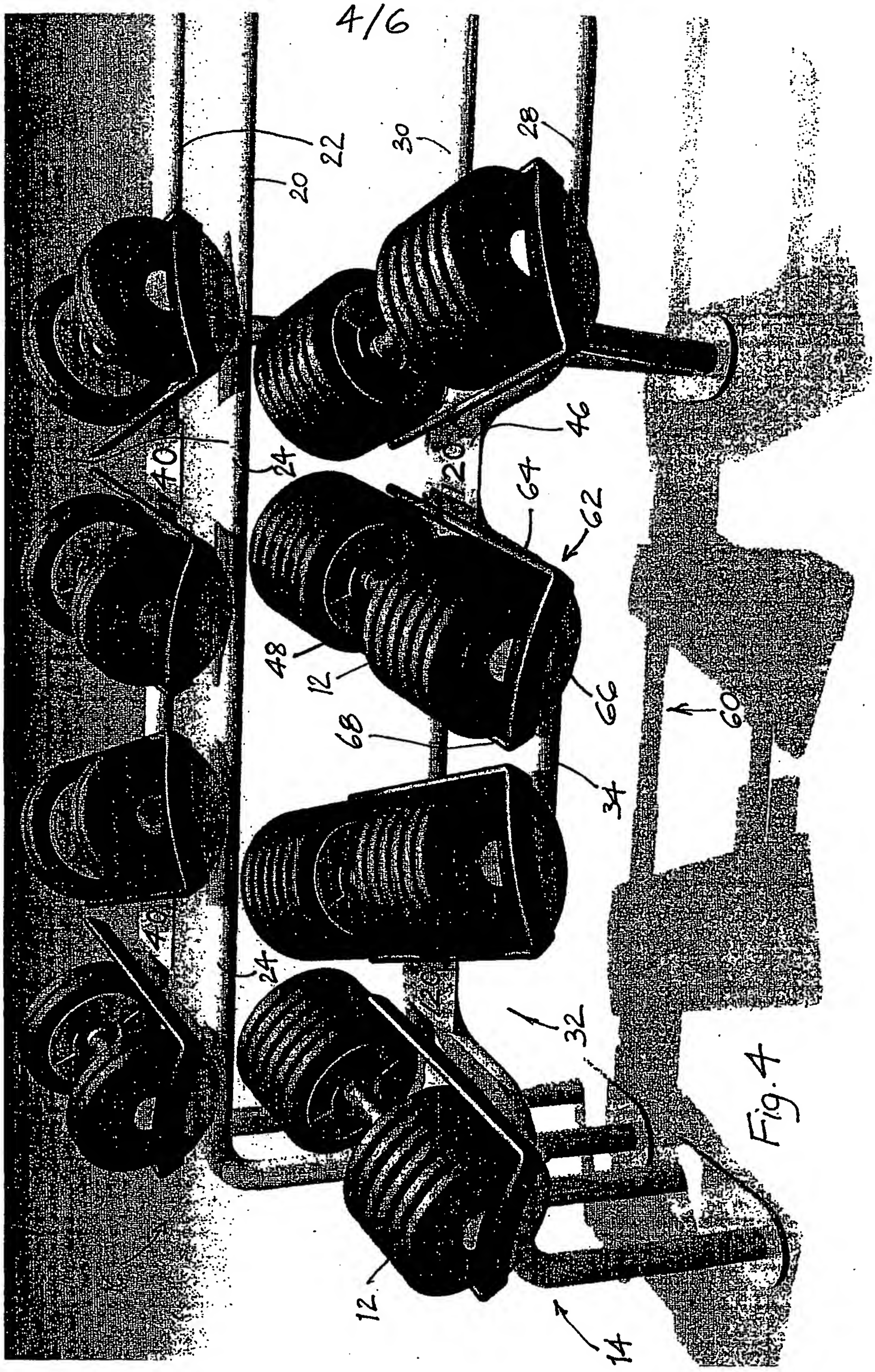
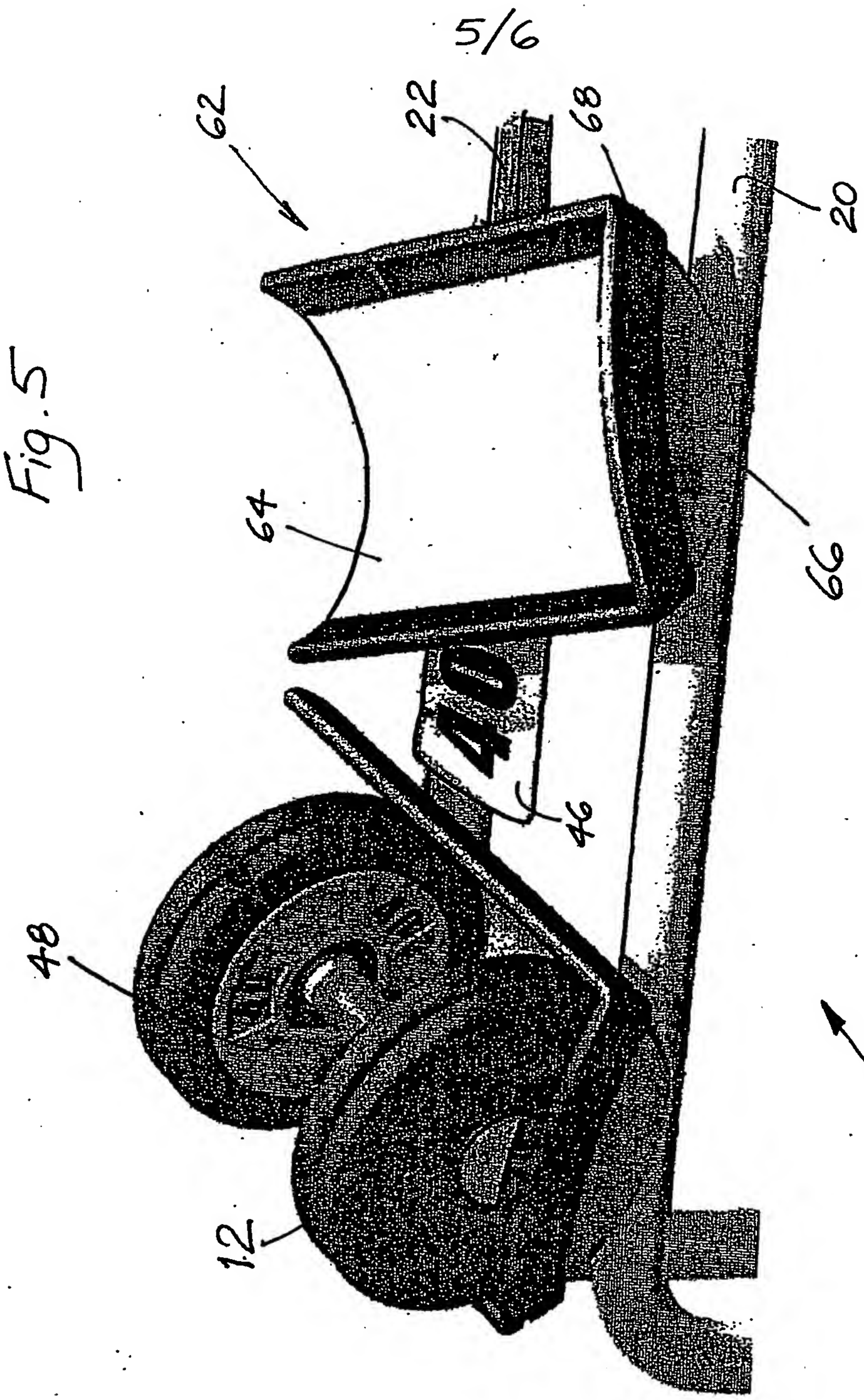


Fig. 4

Fig. 5



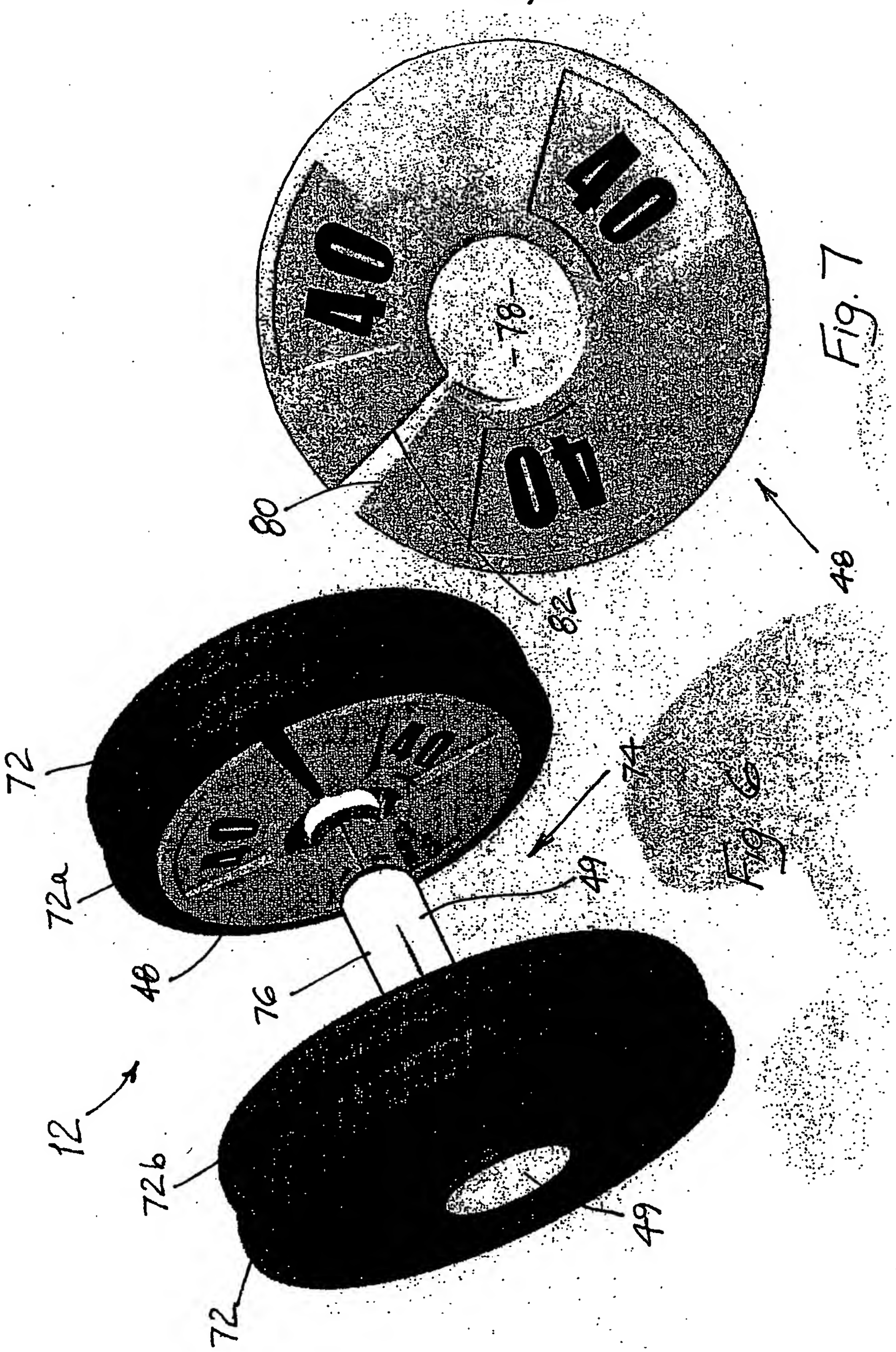


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001979

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A63B 71/04 (2006.01) *A63B 21/072* (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DWPI: A63B 21/-, 11/-, 71/- and keywords: dumbbell, rack, gap, location, body part, total weight, identify and similar terms
CAPRI: A63B 11/00, 11/02

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 2005/0051445 A1 (MEEHAN et al.) 10 March 2005 See, especially: Figure 7	1-3
A	US 5637059 A (DALEBOUT) 10 June 1997 See, especially: Figure 1	1-3
A	US 5651758 A (CERVANTES) 29 July 1997 See, especially: Figure 1; column 1, lines 19-28	1-3

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 April 2006	13 APR 2006
Name and mailing address of the ISA/AU	Authorized officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	ROSEMARY LONGSTAFF Telephone No : (02) 6283 2637

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001979

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	US 2005/0065003 A1 (KLOTZKI) 24 March 2005 See, especially: Figure 1; paragraph 16	4-6
A	US 2002/0022559 A1 (KRULL) 21 February 2002 See, especially: Figure 2; paragraph 89; claim 6	4-6
A	WO 2001/083039 A2 (BARBER) 8 November 2001 See, especially: Figure 4; abstract	4-6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001979

Supplemental Box
(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: III

In the specification, there are three inventions, as follows:

1. Claims 1-3 relate to a rack stand for supporting dumbbells, characterized by a gap allowing a person to lift a dumbbell without leaning over the rack stand;

2. Claims 4-6 relate to a dumbbell characterized by a means to identify the total weight of the dumbbell;

3. Claim 7 relates to a dumbbell support plate characterized by a generally U-shaped member having a retention wall across an end, adapted to be lowermost when the support plate is supported in an inclined position on a rack stand.

The characterizing features listed above are special technical features. Since the three sets of claims do not share any of the special technical features identified, the claims do not relate to a single inventive concept, a priori.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No..
PCT/AU2005/001979

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	2005051445	EP	1555049				
US	5637059						
US	5651758						
US	2005065003	DE	1020040072				
US	2002022559	US	5876313	US	6033350	US	6099442
		US	6186927	US	6322481	US	6402666
		US	6416446	US	6422979	US	6629910
		US	6669606	US	6679816	US	6733424
		US	6746381	US	6749547	US	6872173
		US	6899661	US	6902516	US	6974405
		US	2001003723	US	2001051566	US	2002002106
		US	2002055426	US	2002115539	US	2003153439
		US	2004220025				
WO	0183039	AU	54568/01	CA	2307505	CA	2408001
		EP	1280584	MX	PA02010765	NZ	522754

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001979

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-6

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.